

## Education

- 2019 **PhD Molecular Evolution, Phylogenetics - UC Santa Barbara.**
- 2016 **M.A. Molecular Evolution, Phylogenetics, Bioinformatics - UC Santa Barbara.**
- 2011 **B.A. Biology - Bowdoin College.**

## Research Interests

I study how sensory systems originate, evolve, and integrate with other processes to create emergent processes like behavior. I investigate questions surrounding the evolution of sensory-motor pathways using comparative frameworks in non-model organisms coupled with sequencing, bioinformatics, and microscopy techniques. My research and outreach projects all aim at improving objectivity in data handling, technological literacy, as well as accessibility and diversity in STEM.

## Publications

- 2022 Velle K.B, Kennard A.S, Trupinić M., Ivec A., **Swafford A.J.M.**, Nolton E., Rice L., Tolić I.M., Fritz-Laylin L.K., Wadsworth P., *Naegleria's mitotic spindles are built from unique tubulins and highlight core spindle features*, Curr. Bio., doi: 10.1016/j.cub.2022.01.034.
- 2021 **Swafford Andrew J.M.** and L.K Fritz-Laylin, *Evolutionary Cell Biology: A Modern Synthesis of Cell and Evolutionary Biology*, Chapter: Encyclopedia of Biochemistry III (pg. 89-96), doi: 10.1016/B978-0-12-819460-7.00298-X.
- 2020 **Swafford Andrew J.M.**, Hussey S.P. & Fritz-Laylin L.K., *High-efficiency electroporation of chytrid fungi*, Sci. Reports, doi: 10.1038/s41598-020-71618-2.
- 2019 **Swafford Andrew J.M.** and Todd H. Oakley., *Light-Induced Stress as a Primary Evolutionary Driver of Eye Origins*, Integrative & Comparative Bio., doi: 10.1093/icb/icz064.
- 2018 **Swafford Andrew J.M.**, and Todd H. Oakley., *Multimodal Sensorimotor System in Unicellular Zoospores of a Fungus*, Journal of Experimental Biology, doi: 10.1242/jeb.163196.
- 2018 Picciani N, Kerlin J.R., Sierra N.C., **Swafford A.J.M.**, Ramirez, M.D., Cannon J.T., ... & Oakley T.H., *Prolific origination of eyes in Cnidaria with co-option of non-visual opsins*, Current Biology, doi: 10.1016/j.cub.2018.05.055.
- 2017 Boyero L., Graça M. A., Tonin A. M., Pérez, J., **Swafford A.J.M.**, Ferreira, V., ... & Albariño, R. J., *Riparian plant litter quality increases with latitude*, Scientific Reports, 7, 10562.
- 2016 Ramirez, M.D., †Pairett, A. N., †Pankey, S.M., †Serb, J. M., †Speiser, D. I., †**Swafford, A.J.M.**, Oakley, T. H., *The last common ancestor of most bilaterian animals possessed at least 9 opsins*, Genome Biology and Evolution, doi: 10.1093/gbe/evw248.
- 2015 Lenkov K., Lee M. H., Lenkov O. D., **Swafford A.J.M.**, Fernald, R. D., *Epigenetic DNA Methylation Linked to Social Dominance*, PLOS ONE, doi: 10.1371/journal.pone.0144750.

† Authors contributed equally.

## Grants and Awards

- 2022 **Early Career Scientist Seminars Award - JF Crow institute for the Study of Evolution, UW Madison**
- 2021 **Models to Medicine and Nikon Center of Excellence Scholarship - Selecte to attend MDI QFM workshop**

- 2020 **Postdoctoral Research Fellow in Biology** - *National Science Foundation*  
3 years of funding to study sensory and motor pathway evolution and integration in Chytrid fungi with training and outreach to URM students.
- 2018 **Faculty Minigrant** - *UC Santa Barbara*  
Funds for phylogenetics pedagogy development
- 2018 **Undergraduate Research and Creative Activities Grant** - *UC Santa Barbara*
- 2018 **Ellen Schamberg Burley Graduate Award** - *UC Santa Barbara*
- 2018 **Summer Undergraduate Research Fellowship** - *UC Santa Barbara (declined)*
- 2017 **Block Grant** - *UC Santa Barbara*  
Funds for writing and research development
- 2017 **Wake Award Honorable Mention** - *Society for Integrative and Comparative Biology*  
Given to the best student presentation in the Division of Phylogenetic and Comparative Biology
- 2016 **Outstanding Teaching Assistant Award** - *UC Santa Barbara Academic Senate*  
Awarded to 3 TAs out of 2,500. Recognition for inclusive pedagogy and involvement of minorities in STEM.
- 2016-19 **Charlotte Magnum Support Award** - *Society for Integrative and Comparative Biology*
- 2014 **Sigma Xi GIAR** - *Selected from applicants without a PI in Sigma Xi*
- 2013 **Rosemary Grant Award** - *Society for the Study of Evolution*

## Presentations & Workshops

- Invited** 2022 **Swafford, A.J.M.**, Reynolds, G., Fritz-Laylin, L.K., *Chemotaxis to Host and Self-generated Cues Guides Infectious Behavior in the Fungal Pathogen *Batrachomyces dendrobatidis**, Gordon Conference; Fungal Pathogens, Presentation.
- 2022 **Swafford, A.J.M.**, Reynolds, G., Fritz-Laylin, L.K., *Infectious Behavior of the Fungal Pathogen *Batrachomyces dendrobatidis* is Primed by Critical Threshold of Host Cue*, Gordon Conference; Fungal Pathogens, Poster.
- 2022 Quantitative Fluorescent Microscopy, *Mount Desert Island*, Workshop.
- 2021 **Swafford, A.J.M.**, Reynolds, G., Fritz-Laylin, L.K., *Chemotaxis in the fungal pathogen *Batrachomyces dendrobatidis* alters spore distribution*, ASCB, Presentation.
- Invited** 2019 **Swafford, A.J.M.**, Van De Wyngaerde, K.R., Oakley, T.H., *Insights into Early Sensory Evolution from Sensorimotor Systems in Unicellular Fungus Zoospores*, SICB, Presentation.  
Finalist for Rising Star in Organismal Botany Award
- 2019 **Swafford, A.J.M.**, Oakley, T.H., *Opsin Family Macroevolution and the Origin of Light Sensitivity in GPCRs*, SICB, Poster.
- Invited** 2018 **Swafford, A.J.M.**, Oakley, T.H., *Multisensory Systems in Unicellular Fungi*, Gordon Conference: Cellular and Molecular Fungal Biology, Presentation.
- Invited** 2018 **Swafford, A.J.M.**, Van De Wyngaerde, K.R., Locker-Cameron, T., Oakley, T.H., *Co-option as a driver of early multisensory integration.*, Gordon Conference: Cellular and Molecular Fungal Biology, Poster.
- 2018 **Swafford, A.J.M.**, Oakley, T.H., *Multimodal Sensorimotor System in Unicellular Zoospores of a Fungus*, SICB, Presentation.
- 2017 **Swafford, A.J.M.**, Oakley, T.H., *Evolution at the Speed of Light: Opsin Family Diversity*, SICB, Presentation.
- 2017 **Swafford, A.J.M.**, Oakley, T.H., *The Origin and Tempo of Opsin Family Evolution*, SSB, Presentation.
- 2016 **Swafford, A.J.M.**, Oakley, T.H., *Sensory Suites in Unicellular Fungus Spores*, SICB, Poster.

- 2015 \***Swafford, A.J.M.**, \*Wightman, H., *Duplication and Ecology of Opsin in Select Odonates*, Tree Thinkers Workshop, Presentation.

\*Authors contributed equally

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## Teaching Experience

- 2017-19 **Faculty/Instructor of Record**, *Research in Biology*, Cornell University, SML.  
2017 **Guest Lecture**, *Guiding Principles of Macro & Microevolution*, Intro. to Marine Science - UCSB  
2017 **Guest Lecture**, *Evolution of Sensory Genes and Proteins*, Cell Physiology - UCSB  
2016-17 **Guest Lecture**, *An Introduction to R: Data Manipulation and Logic*, Investigative Marine Biology Laboratory - Cornell, SML  
2016-17 **Guest Lecture**, *Statistics and Data Analysis in R*, Investigative Marine Biology Laboratory - Cornell, SML  
2013-18 **Teaching Assistant**, *UC Santa Barbara*  
Courses: Invertebrate Zoology, Introductory Biology, Principles of Evolution, Macroevolution, Plant Diversity.  
Summary: Teach 4 one-hour sections or 2 four-hour lab sections each week and maintaining course websites and online resources. Lecture courses rely heavily on TAs to teach the fundamentals of tree thinking, phylogenetics, and evolutionary theory.  
2009-17 **Teaching Assistant**, *Cornell University, SML*  
Courses: Investigative Marine Biology Lab, Marine Biology, Marine Approach to Introductory Biology, Evolution and Marine Diversity, Whales Seals and Sharks, Anatomy and Function of Marine Vertebrates, Ecology of the Marine Environment, Ecology of Animal Behavior.  
Summary: Supervision of students, aid with coursework and management of online course data, grading, lectures. Write quizzes and exams, and contribute to the creation, execution, analysis, and presentation of independent research projects for each student.

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## Outreach, Service, & Mentorship

- 2022 **Reynolds G. (Undergraduate Mentee)**, Swafford, A.J.M., Fritz-Laylin, L.K., *Infectious Behavior of the Fungal Pathogen *Batrachochytrium dendrobatidis* is Primed by Critical Threshold of Host Cue*, SACNAS NE Regional Conference.  
2022 **SACNAS Reviewer**  
Reviewing abstracts, session proposals, and travel grants.  
2019 **Data Carpentry Instructor Training**  
Training to lead R, Python, Git, and Bash data carpentry workshops.  
2019 **"Ask an Expert Booth" SICB program**  
Help booth for all things phylogenetics, bioinformatics, comparative methods, and evolution.  
2019 **CAMP mentor**  
Mentored 3 undergraduates from underrepresented minorities in a hands-on research project.  
2018 **UCSB Open-Access Week Workshop**  
An Introduction to Command line, Git, and Open-Source Hosting.  
2018 **FUSE mentor**  
Teach science to parents and children in classrooms of local elementary schools; focused on involving underrepresented minorities.  
2018 **Van De Wynguarde, K. (Undergraduate Mentee)**, Swafford A.J.M., *Visual Systems in Unicellular Fungi Diversify Through Co-Option of Ion Channels*, Undergraduate Research Symposium, UCSB, [Link to poster](#).

- 2017-18 **Scientific Communication Workshop.**  
Developed and taught an open workshop on communicating science to diverse audiences. [Link to blogs.](#)
- 2016-17 **R coding bootcamp for Undergraduate Biologists.**
- 2016 **TALES Teaching & Learning Excellence Series: Interview**
- 2015 Mayner, E., **Swafford A.J.M.**, *Is Sugar Killing You? The Effects of Sugar and Aspartame on the Longevity of C. elegans*, 1<sup>st</sup> in California State, CA Association of Prof. Scientists.
- 2015 **Independent Mentorship Program**  
Mentored two high school students in examining the effects of oil spills on the marine microbial community.
- 2014-18 **Independent Mentorship Program**  
Mentor for six undergraduates from underrepresented minorities investigating the evolution of multisensory integration in fungi.
- 2014 **Independent Mentorship Program**  
Mentored a high school student investigating the effects of sugar and sugar substitutes on C. elegans lifespan
- 2013 **Research Mentorship Program**  
Mentored two high school students in designing and completing a research experiment on senses in fungi.

## Select Computer Skills & Software

Basic OpenCV, Arduino (C/C++), Jekyll

Intermediate SQL, L<sup>A</sup>T<sub>E</sub>X, OpenGL, Gscript, LUA

Advanced Python, R, BASH, Unix, Microsoft Windows, Galaxy, Excel/GSheets

- 2018 **Swafford, A.J.M.**, *KRPYGrabber: Automated Sequence Matching and Retrieval Algorithm and Tool*, [Bitbucket Link](#), Python.
- 2018 **Swafford, A.J.M.**, *LOIC: Iterative, Automated Gene Family Delineation*, [Bitbucket Link](#), Python.
- 2017 **Swafford, A.J.M.**, *corView: iTOL visualization pipeline for Ancestral State Reconstruction*, [Bitbucket Link](#), Python/R.
- 2016-18 **Swafford, A.J.M.**, *Pyphy: A Useful Collection of Python Scripts for Phylogenetic Data Management & Manipulation*, [Bitbucket Link](#), Python.
- 2016 **Swafford, A.J.M.**, *PIPS: Open Source, Phylogenetically Informed Probe Selection for Gene-Family Specific Target Enrichment*, [Bitbucket Link](#), Python/R.
- 2016 **\*Swafford, A.J.M.**, **\*Ramirez M.D.**, **\*Oakley, T.H.**, *opSQL: Database for unified reference of opsin genes and related studies*, [Bitbucket Link](#), Python/SQL.
- 2014 **Swafford, A.J.M.**, **Welch, Z.S.**, *Spekit: GUI and algorithm for growth rate calculations from optical density measurements of microbes*, [Bitbucket Link](#), Python.

\*Authors contributed equally